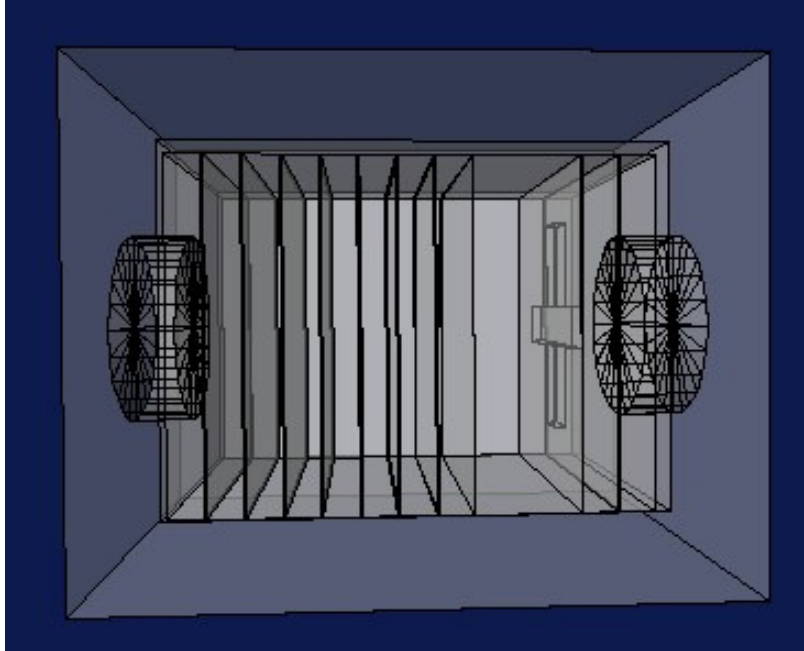


# Beam MC Simulations of the 25m Absorber Failure

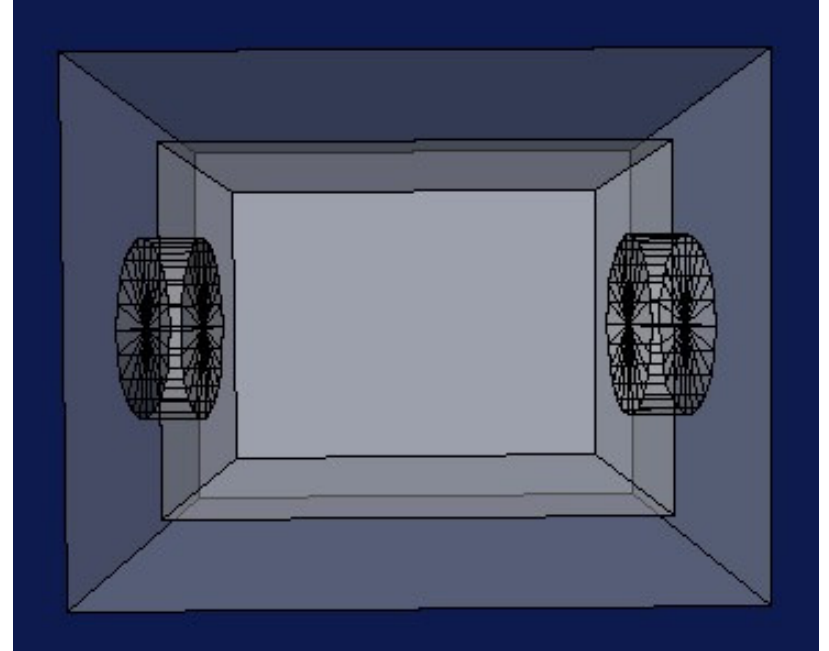
Mike Wilking  
February 14, 2007

# Old 25m Enclosure Geometry

- The absorber plates were set in a concrete box centered on the beamline
- For the 50m geometry, the plates were removed



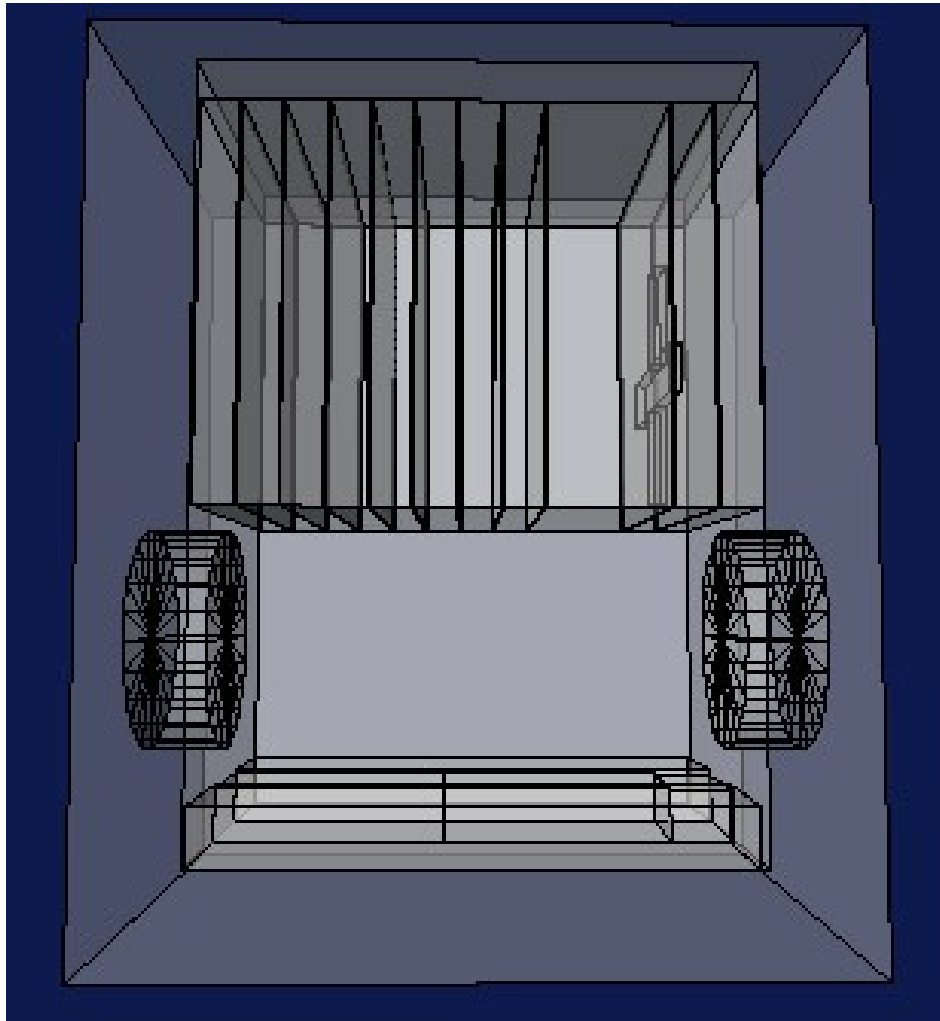
with absorber plates



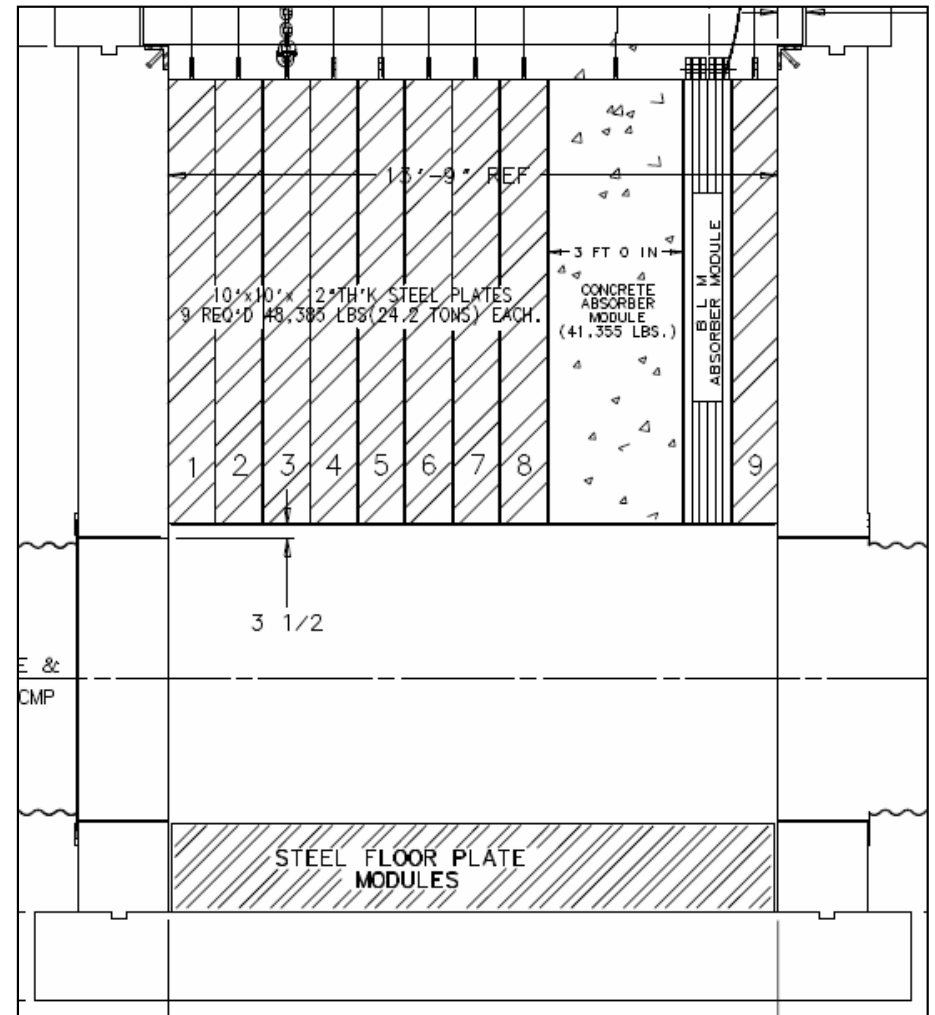
without absorber plates

# New 25m Enclosure Geometry

- The plates are now correctly raised and lowered
- The floor and ceiling (i.e. hanging plates) are now located the proper distance from the decay pipe



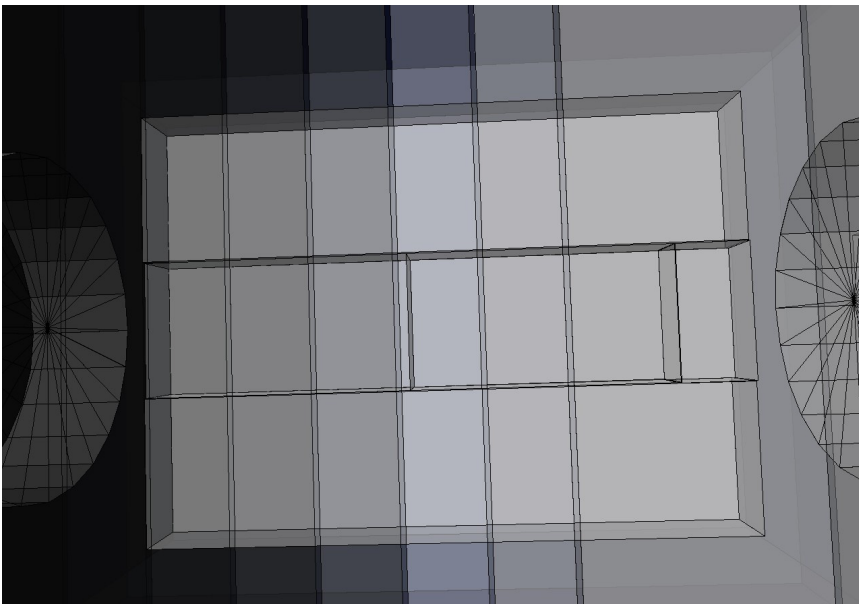
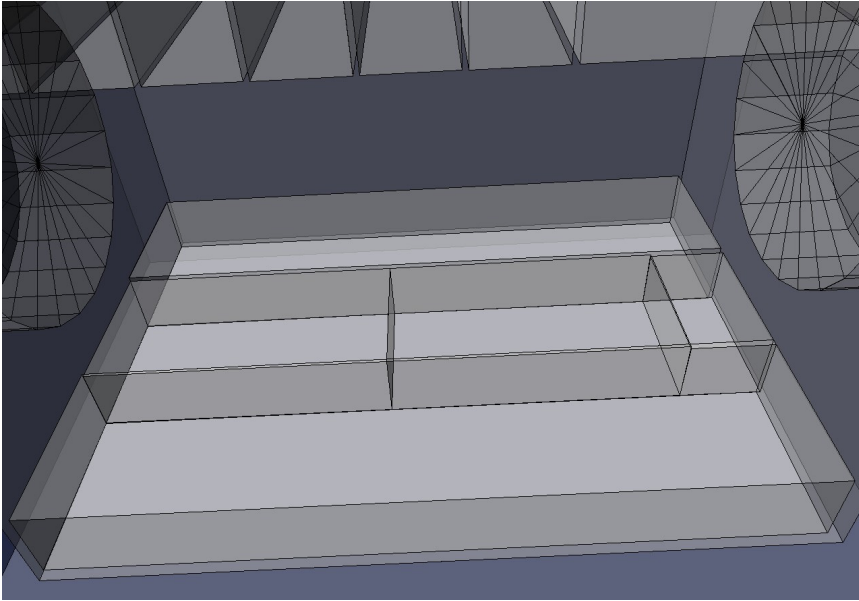
Beam Monte Carlo



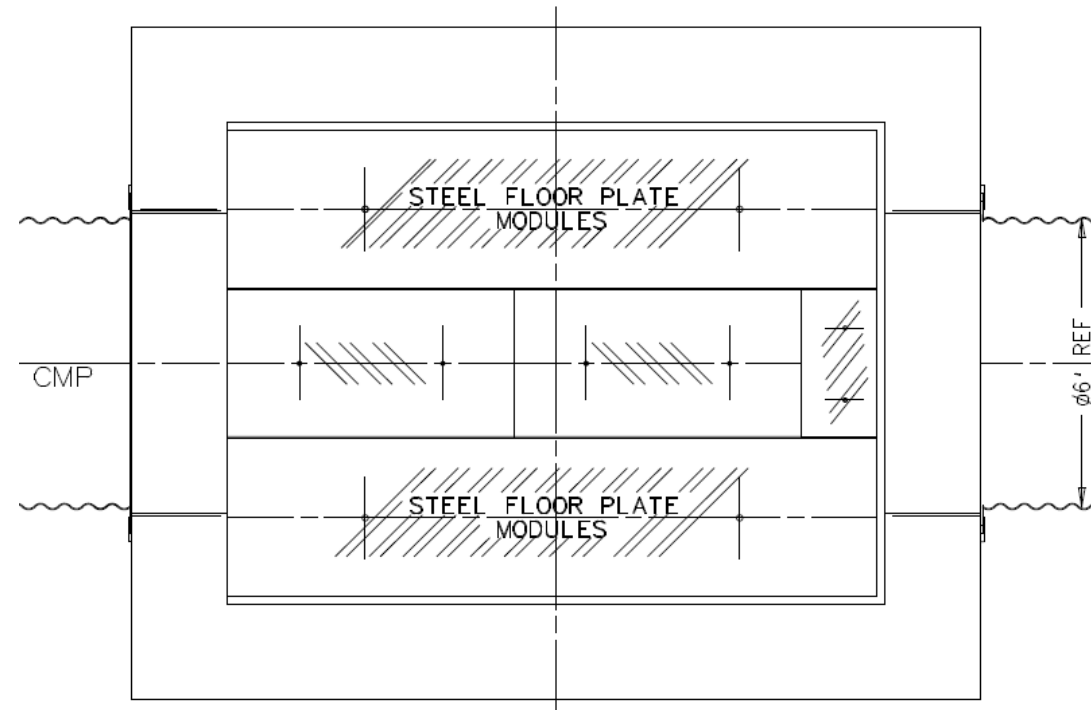
Engineering Drawing

# Enclosure Floor

- The steel blocks on which the plates sit are also simulated



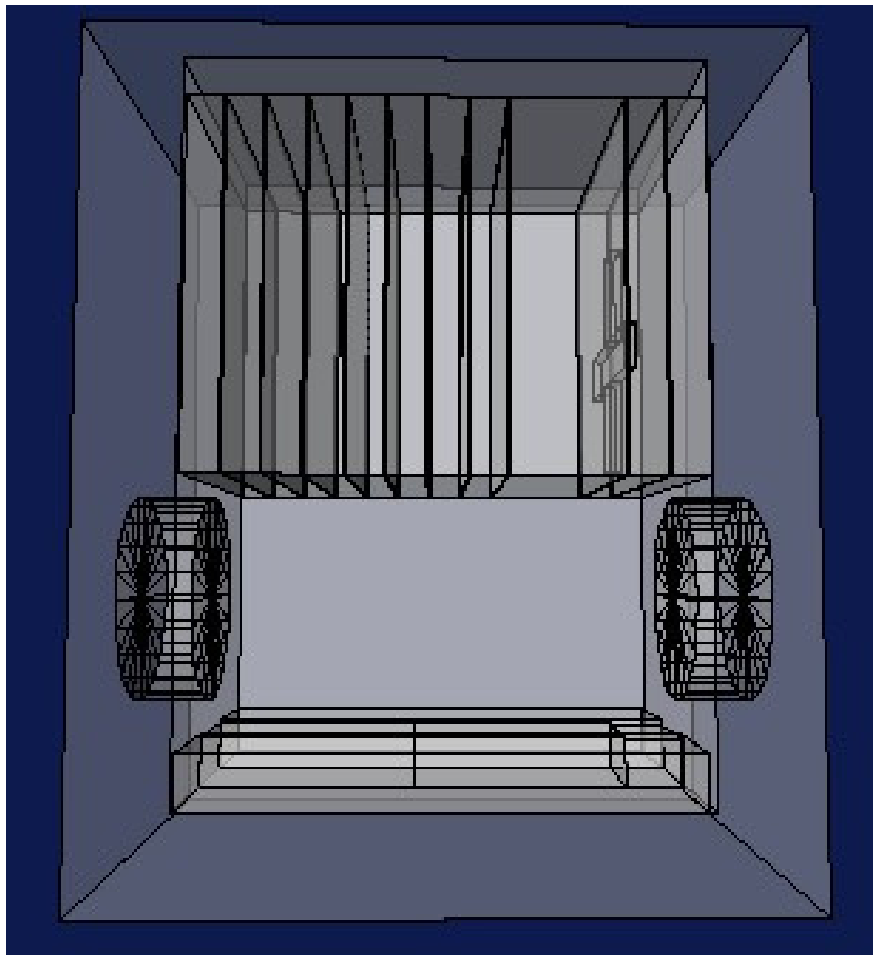
Beam Monte Carlo



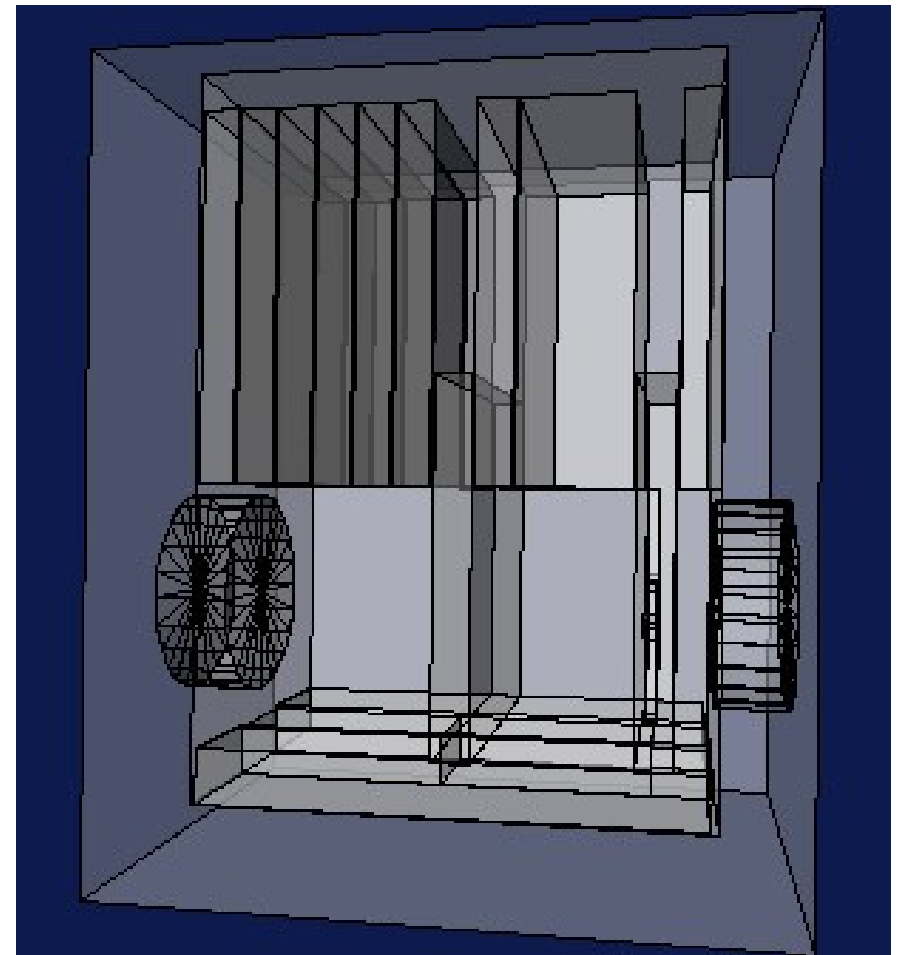
Engineering Drawing

# Failure Simulation

- Three new geometry files were created with module 7 in place, the BLM module in place, and both modules in place



Default Geometry



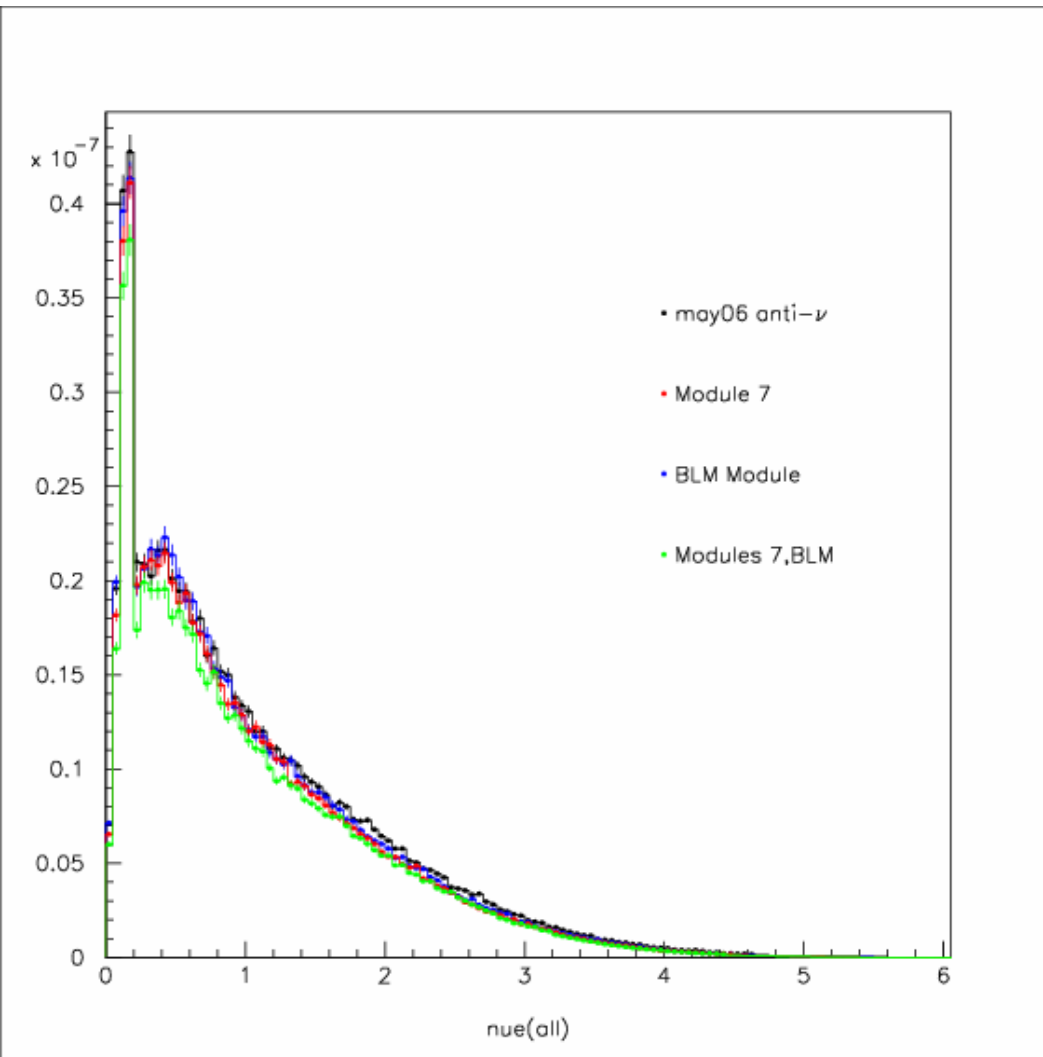
“Both Modules” Geometry

# Absorber Plate Material

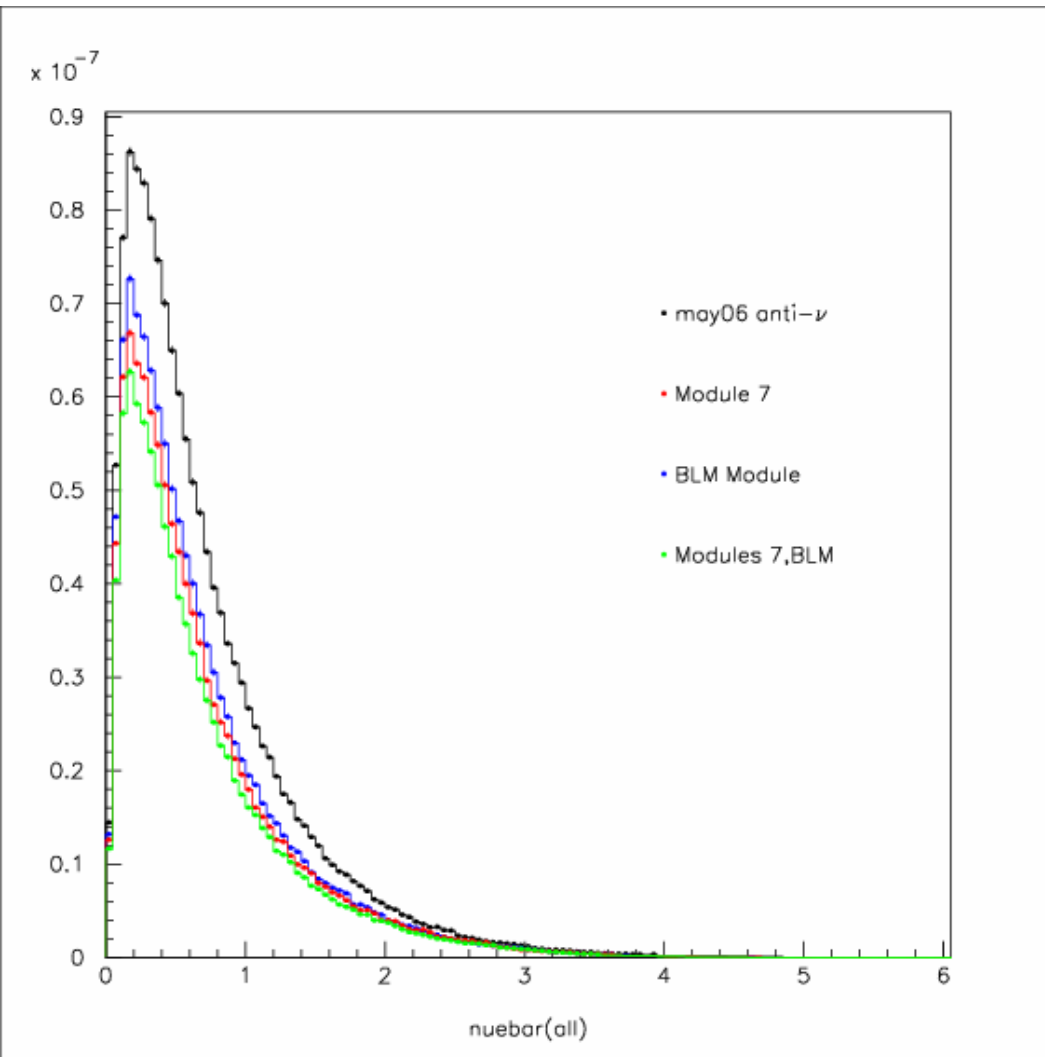
- In the beam MC, the absorber plates used to be composed of pure Iron
- Now they are composed of 1030 steel
  - 98.86% Iron
  - 0.75% Manganese
  - 0.3% Carbon
  - 0.05% Sulfur
  - 0.04% Phosphorus
- As you can see, this change is almost certainly irrelevant

# $\nu_e(\bar{\nu}_e)$ Flux

- The nuebar flux drops significantly
- The nue flux does not change much



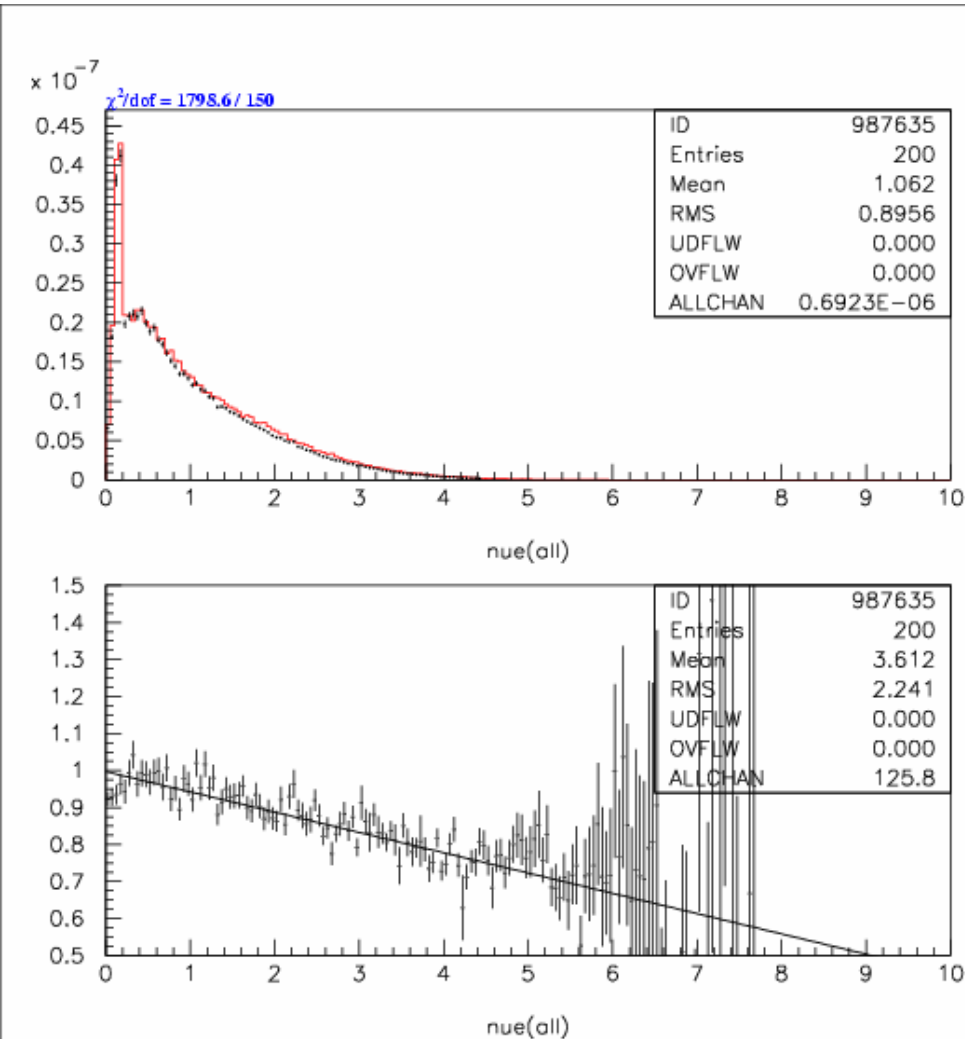
nue energy



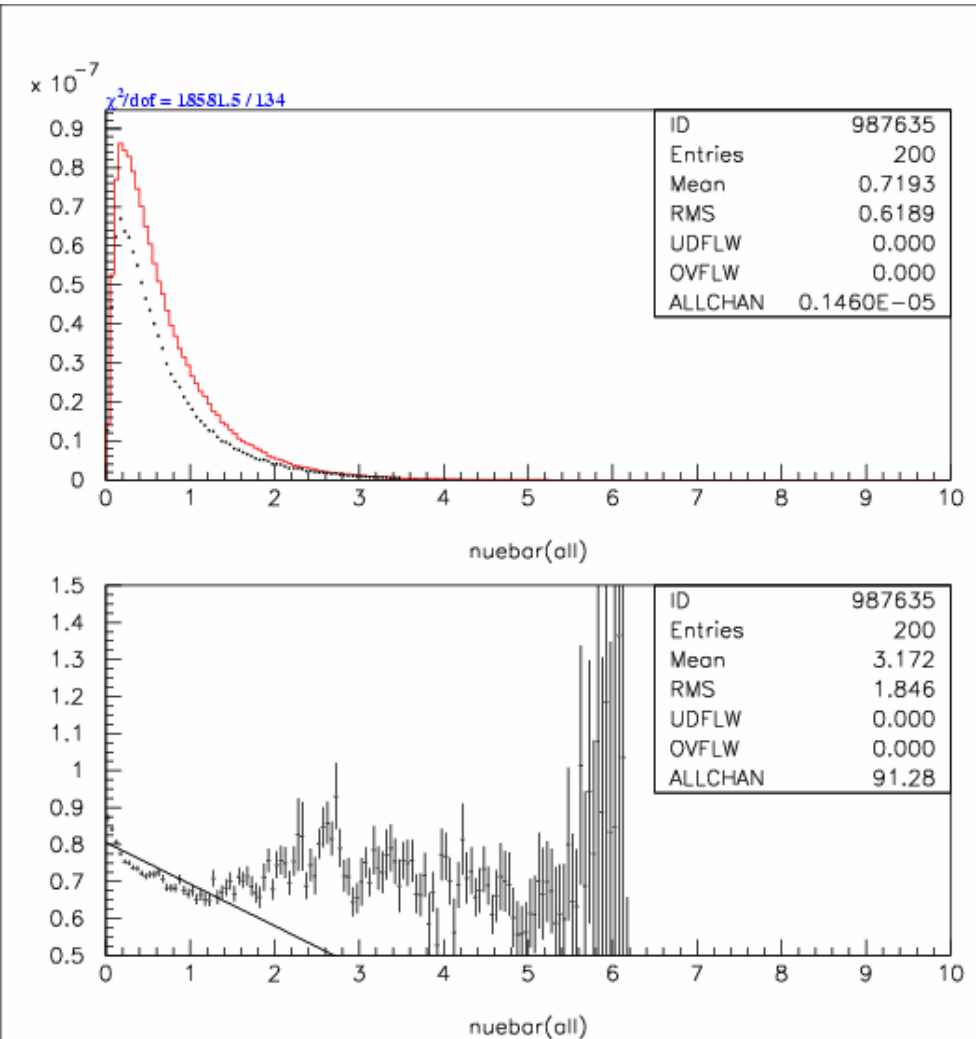
nuebar energy

# $\nu_e(\nu_e)$ Flux (module 7)

- The nuebar flux drops significantly
- The nue flux does not change much



nue energy

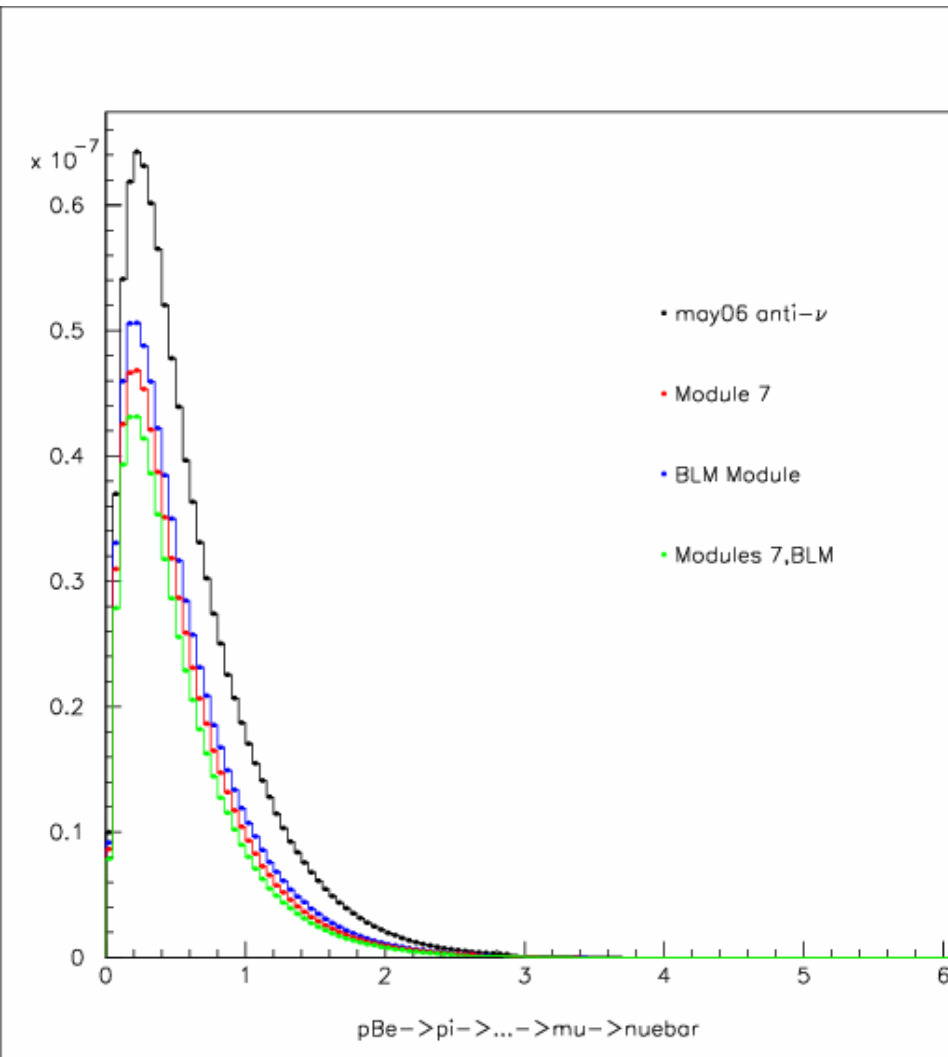


nuebar energy

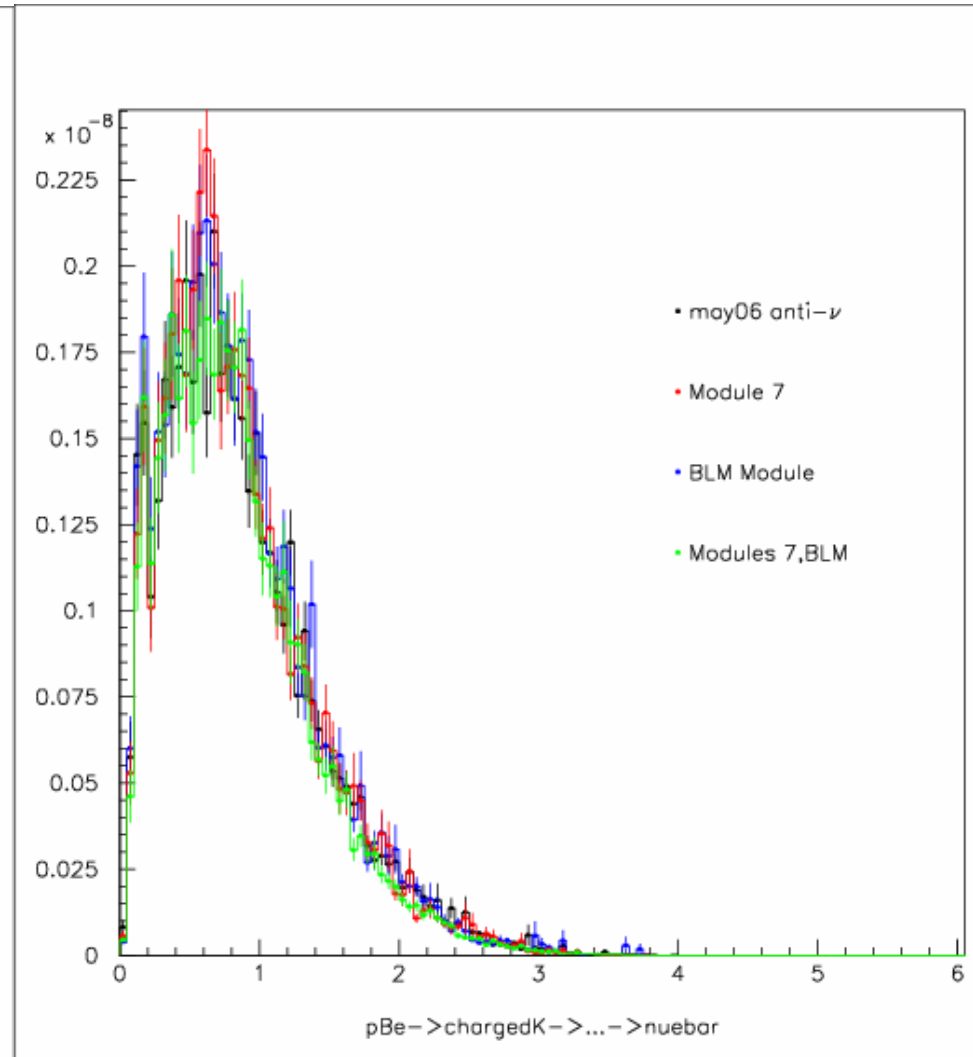


# $\bar{\nu}_e$ Flux (by parent)

- The nuebar flux change is driven by muon decay



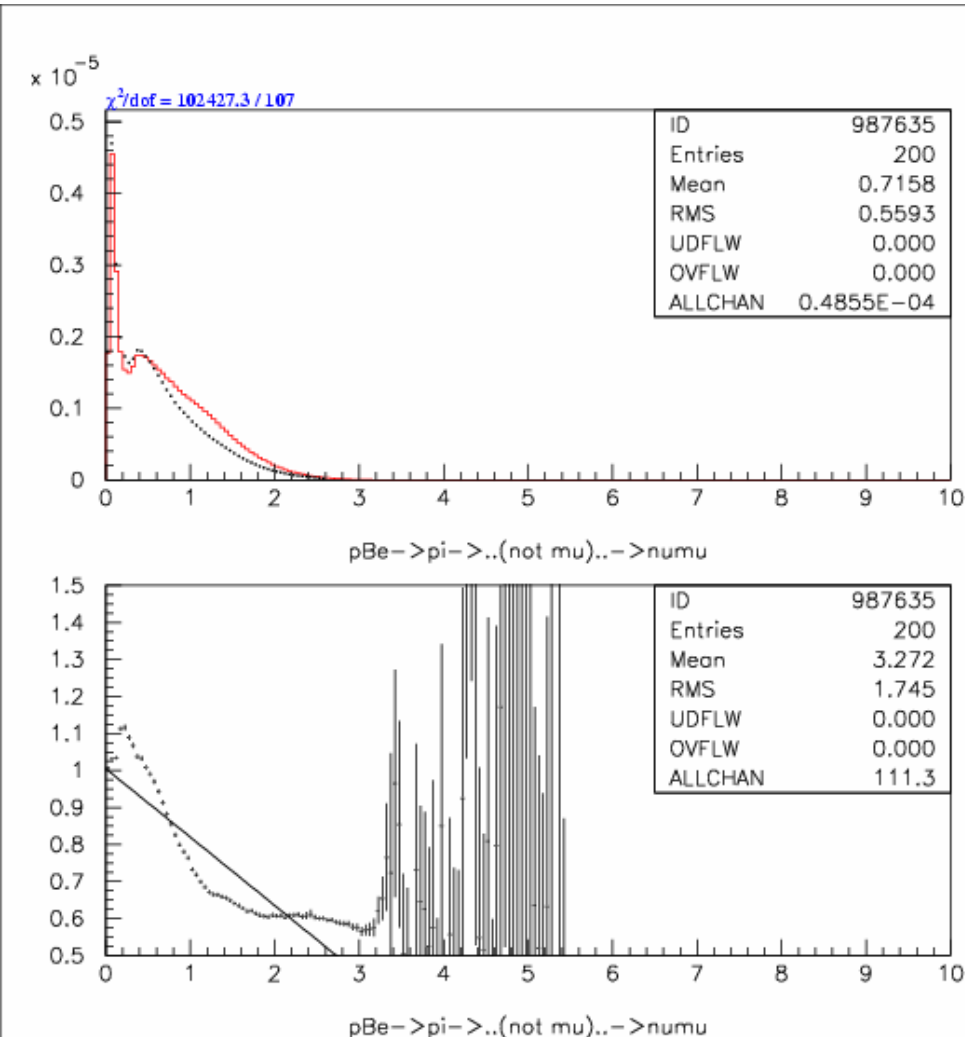
nuebar from mu



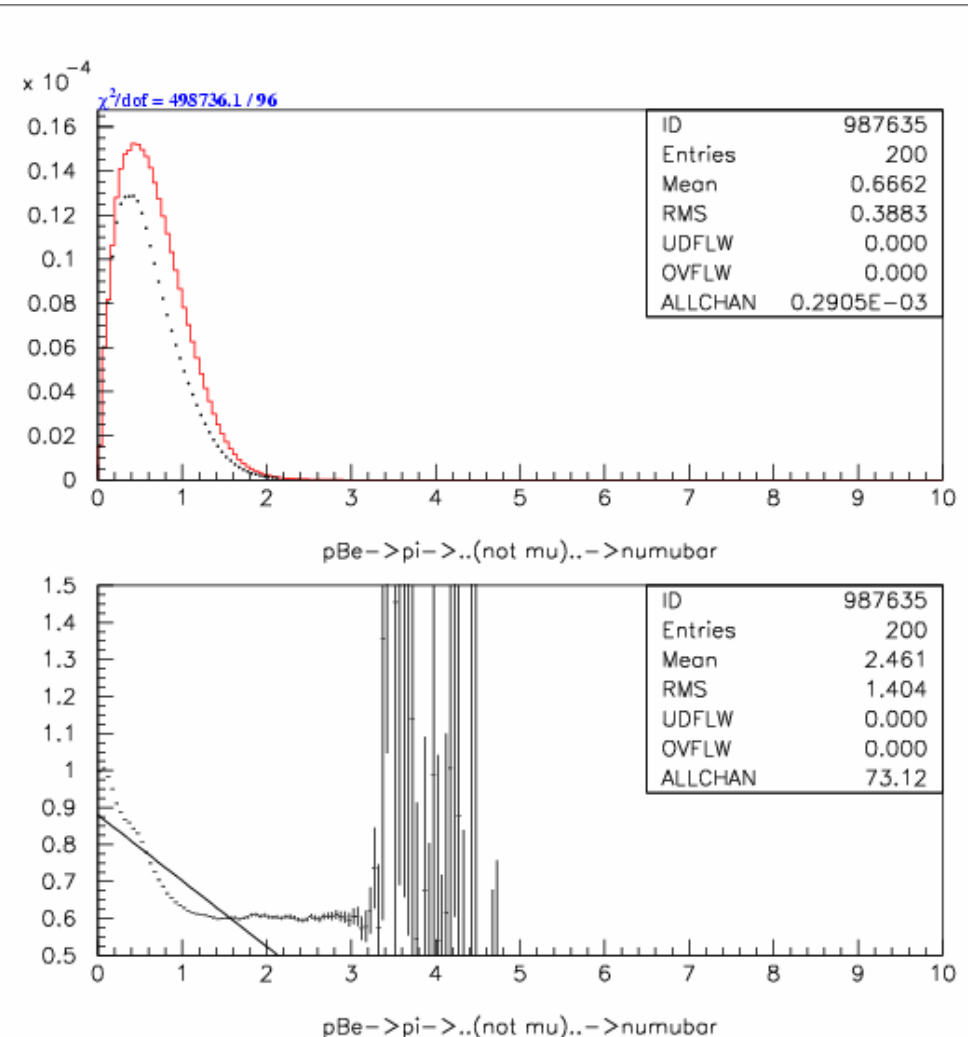
nuebar from charged K

# $\nu_\mu(\bar{\nu}_\mu)$ from charged $\pi$ (Module 7)

- Both the numu and numubar fluxes drop  $\sim 40\%$  for  $E_\nu > 1$  GeV
- There is a significant numu enhancement at low energy



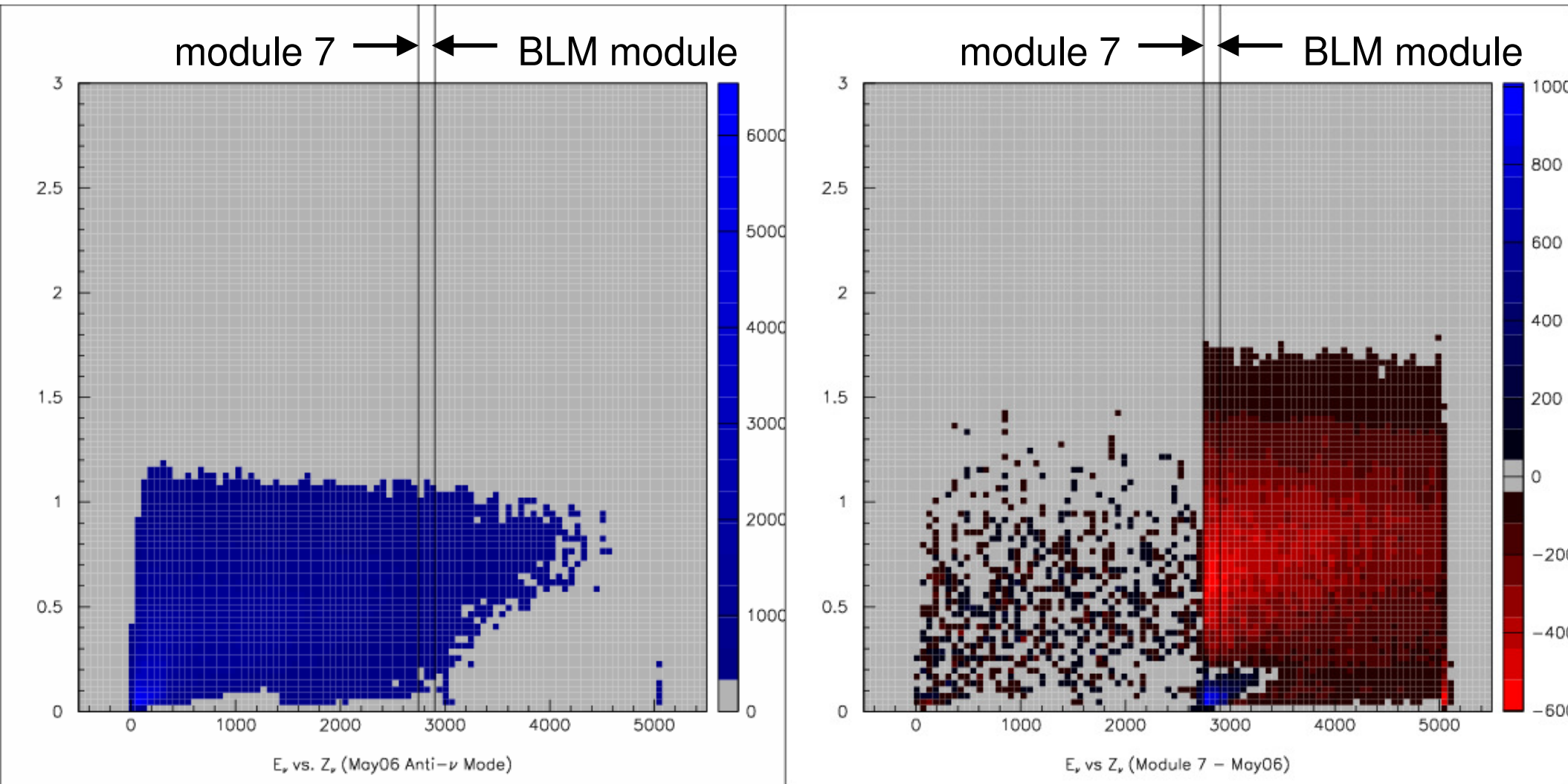
numu energy



numubar energy

# $E_\nu$ vs $Z_\nu$ (all $\nu$ s)

- Just after the fallen module, there is a significant increase in flux at low energy and a decrease at higher energies

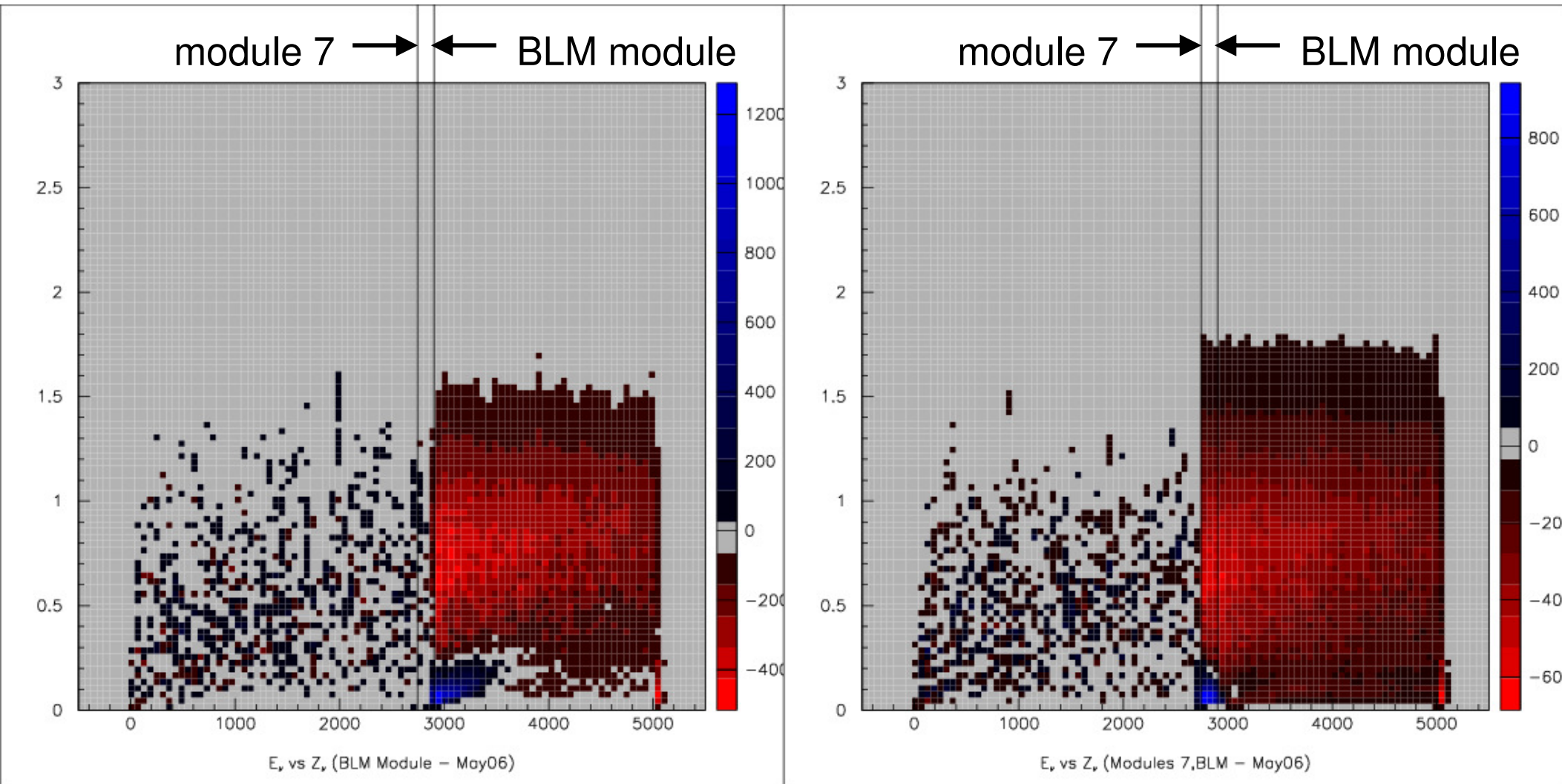


May06 Anti- $\nu$  mode

Difference with and without module 7

# $E_\nu$ vs $Z_\nu$ (all $\nu$ s)

- BLM module behavior is similar to that of module 7
- When both modules are in place, the low energy flux enhancement only occurs between them



Difference with and without BLM module

Difference with and without modules 7, BLM